

RF EXPOSURE EVALUATION
Maximum Permissible Exposure (MPE)**Applicant Name:**

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Date of Testing:

04/22 - 06/17/2025

Test Report Issue Date:

07/21/2025

Test Site/Location:

Element lab., Columbia, MD, USA

Test Report Serial No.:

1M2505200051-04.2A93U

FCC ID:

2A93U-58530

APPLICANT:

Centum research & technology S.L.

EUT Type:

Geolocation System

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part:

FCC Part 1 (§1.1310) and Part 2 (§2.1091)

Test Procedure(s):

KDB 447498 D01 v06

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC KDB 447498 D01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



RJ Ortanez
Executive Vice President



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1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	...	...	f/300	6
1500-100,000	...	...	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

Table 1-1. Limits for Maximum Permissible Exposure (MPE)

1.2 EUT Description

The EUT is a device containing an RF transmitter whose antenna is mounted to the underside of an aerial vehicle. Due to its installation and usage, a distance greater than 20cm will be maintained between the antenna of the device and any nearby user. Also, the antenna will be connected to the radio transmitter via a cable of fixed length, as declared by the manufacturer. The loss of that cable is included in the MPE analysis to assess compliance.

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1.3 Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements. The power generated by each transmitter used in this product was initially measured by a power meter or spectrum analyzer and the powers were recorded. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated at a distance of 20cm.

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4\pi r^2)$

Where,

P_d = Power Density (mW/cm²)

π = 3.1416

P_{out} = output power to antenna (mW)

r = distance between observation point and center of the radiator (cm)

G = gain of antenna in linear scale

Calculated MPE

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1-1.

Frequency Range (MHz)	Band Designation	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Adjusted Antenna Gain (dBi)	EIRP (dBm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
866 - 884.5	LTE B26/5	39.00	1.90	10.00	-8.10	30.90	0.245	0.579
1934.5 - 1990.5	LTE B25/2	37.00	3.50	10.00	-6.50	30.50	0.223	1.000
735.5 - 738.5	LTE B12	36.00	1.90	10.00	-8.10	27.90	0.123	0.492
751	LTE B13	37.00	1.90	10.00	-8.10	28.90	0.154	0.501
2115.4 - 2174.6	LTE B66/4	35.00	4.90	10.00	-5.10	29.90	0.194	1.000
871.6 - 891.6	GSM850	35.00	1.90	10.00	-8.10	26.90	0.097	0.588
1932.2 - 1987.8	GSM1900	34.00	3.50	10.00	-6.50	27.50	0.112	1.000
736 - 738	UMTS B12	34.00	1.90	10.00	-8.10	25.90	0.077	0.492
751	UMTS B13	35.00	1.90	10.00	-8.10	26.90	0.097	0.501
868.4 - 882.0	UMTS 850	35.00	1.90	10.00	-8.10	26.90	0.097	0.584
1932.4 - 1987.6	UMTS 1900	35.00	3.50	10.00	-6.50	28.50	0.141	1.000
2412 - 2462	WLAN	24.07	3.00				0.100	1.000

Table 1-2. Calculated MPE Data for Cellular Band at 20cm Distance

Frequency Range (MHz)	Band Designation	Power Density (mW/cm ²)	Limit (mW/cm ²)	% MPE	Total % MPE
751	LTE B13	0.154	0.50	30.84%	40.98%
2437	WLAN	0.101	1.00	10.13%	

Note(s):

1. The maximum conducted power shown in the table above accounts for the target power plus additional manufacturing tolerances.
2. The Adjusted Antenna Gain is the effective antenna gain when considering the loss of the cable that will be used in the installation of this transmitter.
3. The frequency of operation for each band listed in the table above has been reduced in order to address conducted band edge compliance as demonstrated in the test reports in this filing.

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2.0 CONCLUSION

The device meets the mobile RF exposure limit at a 20cm separation distance as specified in §2.1091 of the FCC Rules and Regulations. An appropriate RF exposure compliance statement will be placed in the user's manual.

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